

FS40SM-6

HIGH-SPEED SWITCHING USE

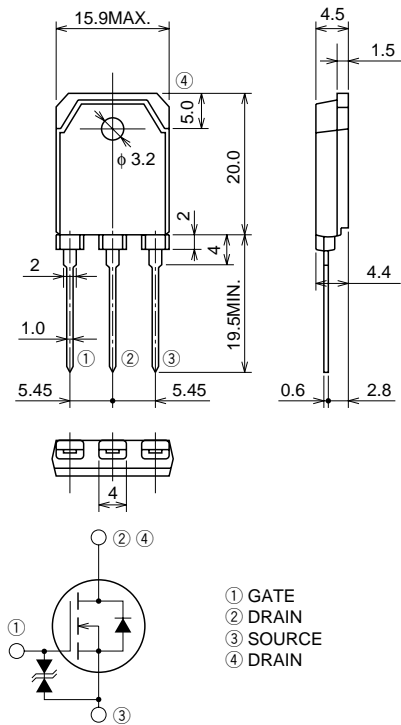
FS40SM-6



- V_{DSS} 300V
- r_{DS (ON)} (MAX) 0.114Ω
- I_D 40A

OUTLINE DRAWING

Dimensions in mm



TO-3P

APPLICATION

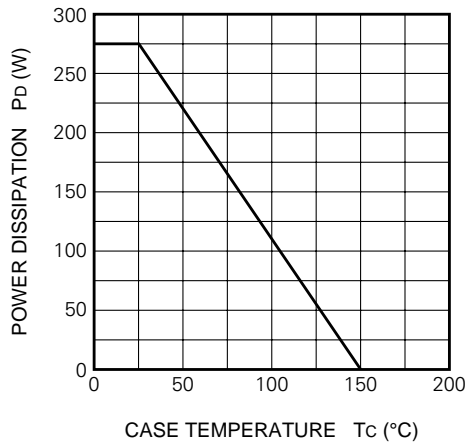
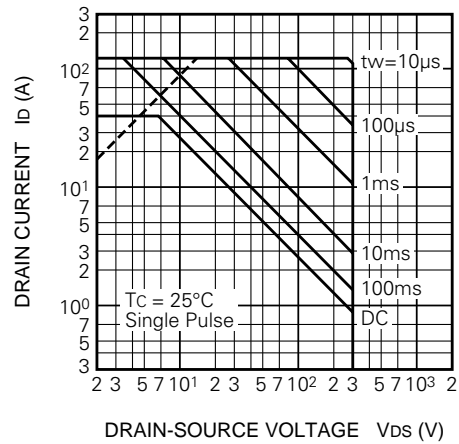
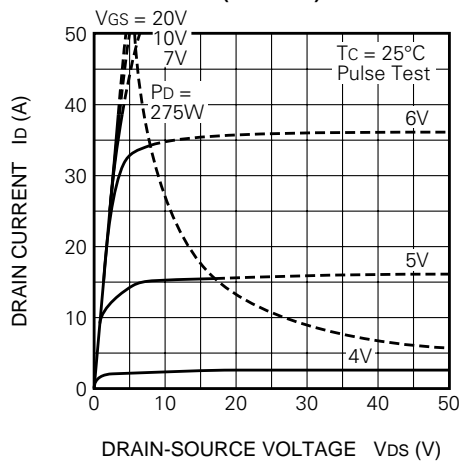
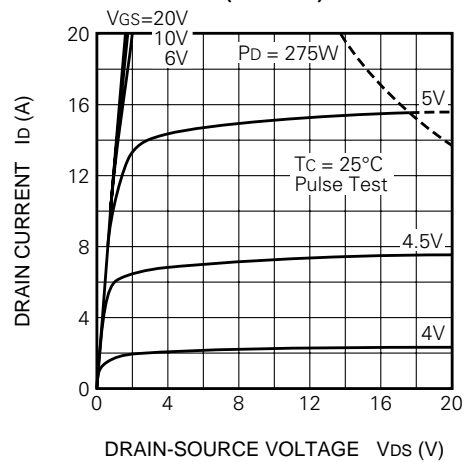
SMPS, DC-DC Converter, battery charger, power supply of printer, copier, HDD, FDD, TV, VCR, personal computer etc.

MAXIMUM RATINGS (T_c = 25°C)

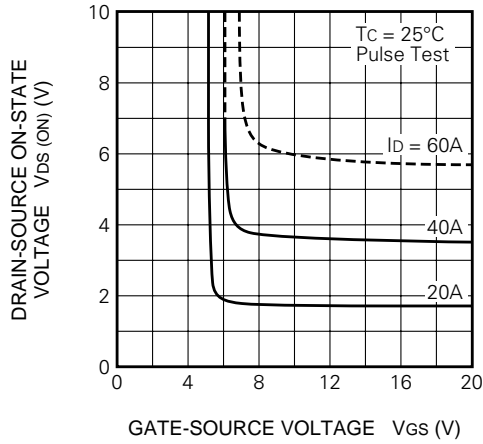
Symbol	Parameter	Conditions	Ratings	Unit
V _{DSS}	Drain-source voltage	V _{GS} = 0V	300	V
V _{GSS}	Gate-source voltage	V _{DS} = 0V	±30	V
I _D	Drain current		40	A
I _{DM}	Drain current (Pulsed)		120	A
P _D	Maximum power dissipation		275	W
T _{ch}	Channel temperature		-55 ~ +150	°C
T _{stg}	Storage temperature		-55 ~ +150	°C
—	Weight	Typical value	4.8	g

ELECTRICAL CHARACTERISTICS ($T_{ch} = 25^{\circ}\text{C}$)

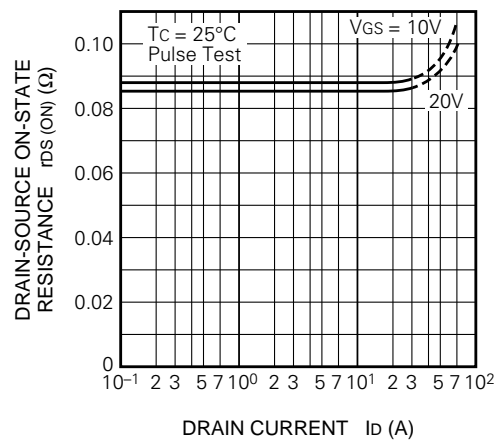
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
$V_{(BR)DSS}$	Drain-source breakdown voltage	$I_D = 1\text{mA}$, $V_{GS} = 0\text{V}$	300	—	—	V
$V_{(BR)GSS}$	Gate-source breakdown voltage	$I_G = \pm 100\mu\text{A}$, $V_{DS} = 0\text{V}$	± 30	—	—	V
I_{GSS}	Gate-source leakage current	$V_{GS} = \pm 25\text{V}$, $V_{DS} = 0\text{V}$	—	—	± 10	μA
I_{DSS}	Drain-source leakage current	$V_{DS} = 300\text{V}$, $V_{GS} = 0\text{V}$	—	—	1	mA
$V_{GS(th)}$	Gate-source threshold voltage	$I_D = 1\text{mA}$, $V_{DS} = 10\text{V}$	2	3	4	V
$r_{DS(on)}$	Drain-source on-state resistance	$I_D = 20\text{A}$, $V_{GS} = 10\text{V}$	—	0.088	0.114	Ω
$V_{DS(on)}$	Drain-source on-state voltage	$I_D = 20\text{A}$, $V_{GS} = 10\text{V}$	—	1.76	2.28	V
$ y_{fs} $	Forward transfer admittance	$I_D = 20\text{A}$, $V_{DS} = 10\text{V}$	12.0	18.0	—	S
C_{iss}	Input capacitance	$V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$, $f = 1\text{MHz}$	—	2850	—	pF
C_{oss}	Output capacitance		—	580	—	pF
C_{rss}	Reverse transfer capacitance		—	110	—	pF
$t_d(on)$	Turn-on delay time	$V_{DD} = 150\text{V}$, $I_D = 20\text{A}$, $V_{GS} = 10\text{V}$, $R_{GEN} = R_{GS} = 50\Omega$	—	45	—	ns
t_r	Rise time		—	125	—	ns
$t_d(off)$	Turn-off delay time		—	310	—	ns
t_f	Fall time		—	140	—	ns
V_{SD}	Source-drain voltage	$I_S = 20\text{A}$, $V_{GS} = 0\text{V}$	—	1.5	2.0	V
$R_{th(ch-c)}$	Thermal resistance	Channel to case	—	—	0.45	$^{\circ}\text{C/W}$

PERFORMANCE CURVES**POWER DISSIPATION DERATING CURVE****MAXIMUM SAFE OPERATING AREA****OUTPUT CHARACTERISTICS (TYPICAL)****OUTPUT CHARACTERISTICS (TYPICAL)**

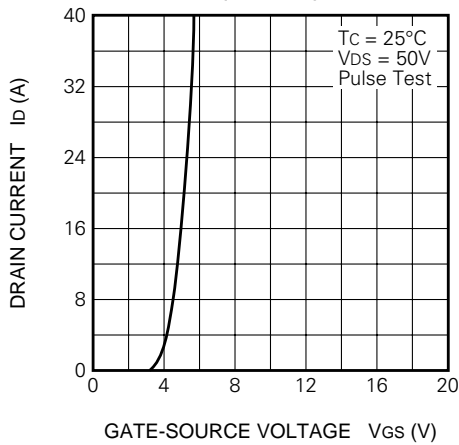
ON-STATE VOLTAGE VS.
GATE-SOURCE VOLTAGE
(TYPICAL)



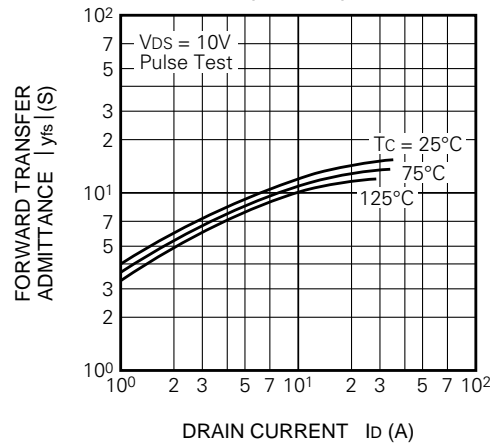
ON-STATE RESISTANCE VS.
DRAIN CURRENT
(TYPICAL)



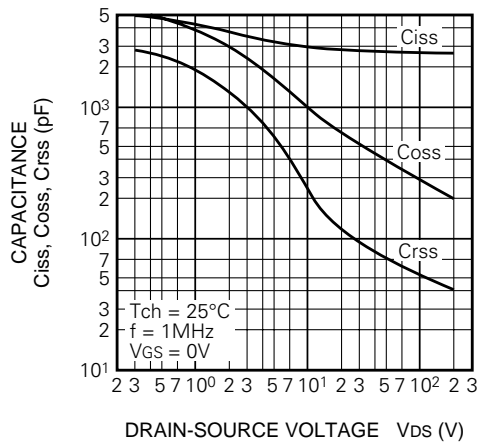
TRANSFER CHARACTERISTICS
(TYPICAL)



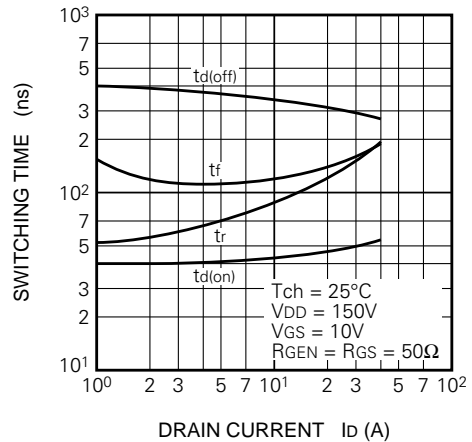
FORWARD TRANSFER ADMITTANCE
VS. DRAIN CURRENT
(TYPICAL)



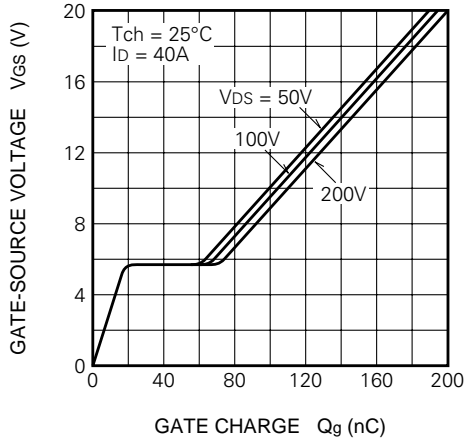
CAPACITANCE VS.
DRAIN-SOURCE VOLTAGE
(TYPICAL)



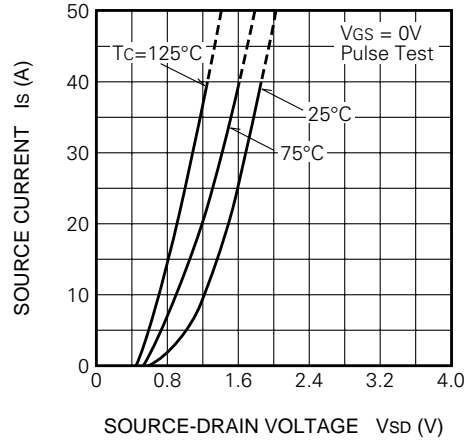
SWITCHING CHARACTERISTICS
(TYPICAL)



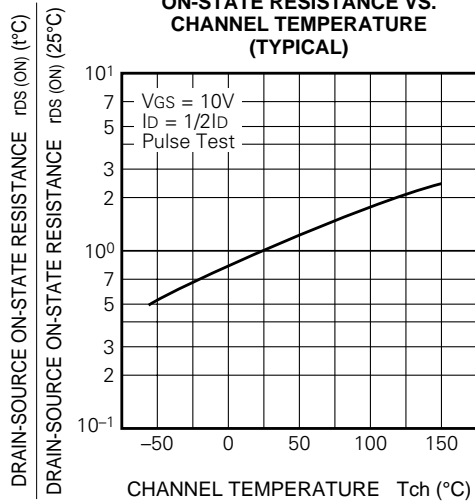
**GATE-SOURCE VOLTAGE
VS. GATE CHARGE
(TYPICAL)**



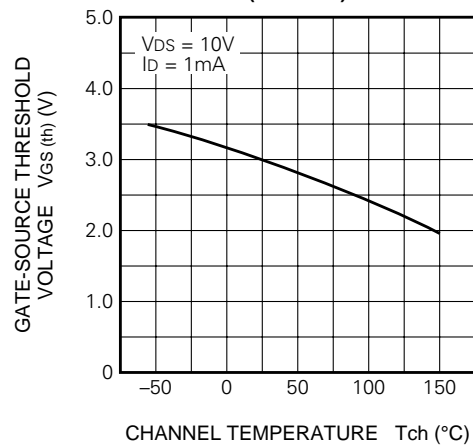
**SOURCE-DRAIN DIODE
FORWARD CHARACTERISTICS
(TYPICAL)**



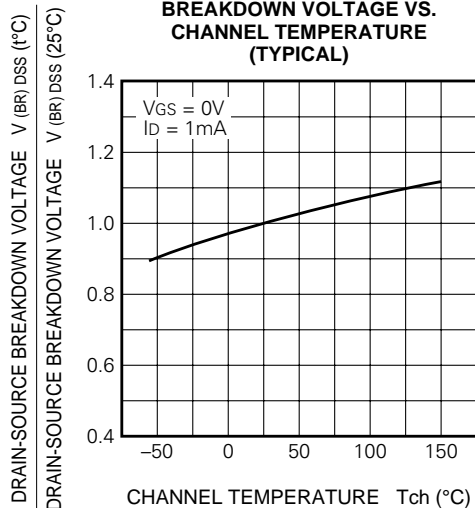
**ON-STATE RESISTANCE VS.
CHANNEL TEMPERATURE
(TYPICAL)**



**THRESHOLD VOLTAGE VS.
CHANNEL TEMPERATURE
(TYPICAL)**



**BREAKDOWN VOLTAGE VS.
CHANNEL TEMPERATURE
(TYPICAL)**



**TRANSIENT THERMAL IMPEDANCE
CHARACTERISTICS**

